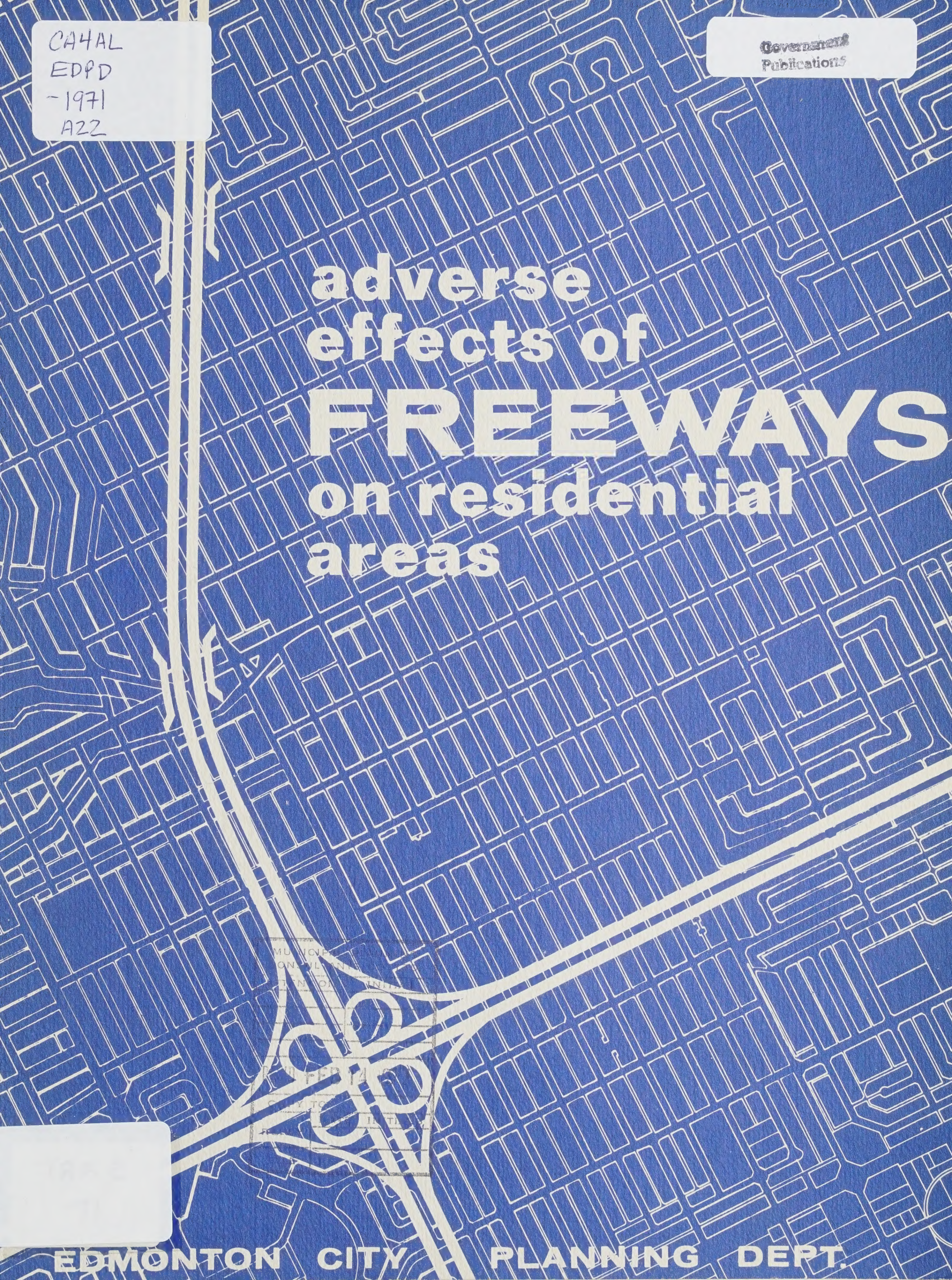
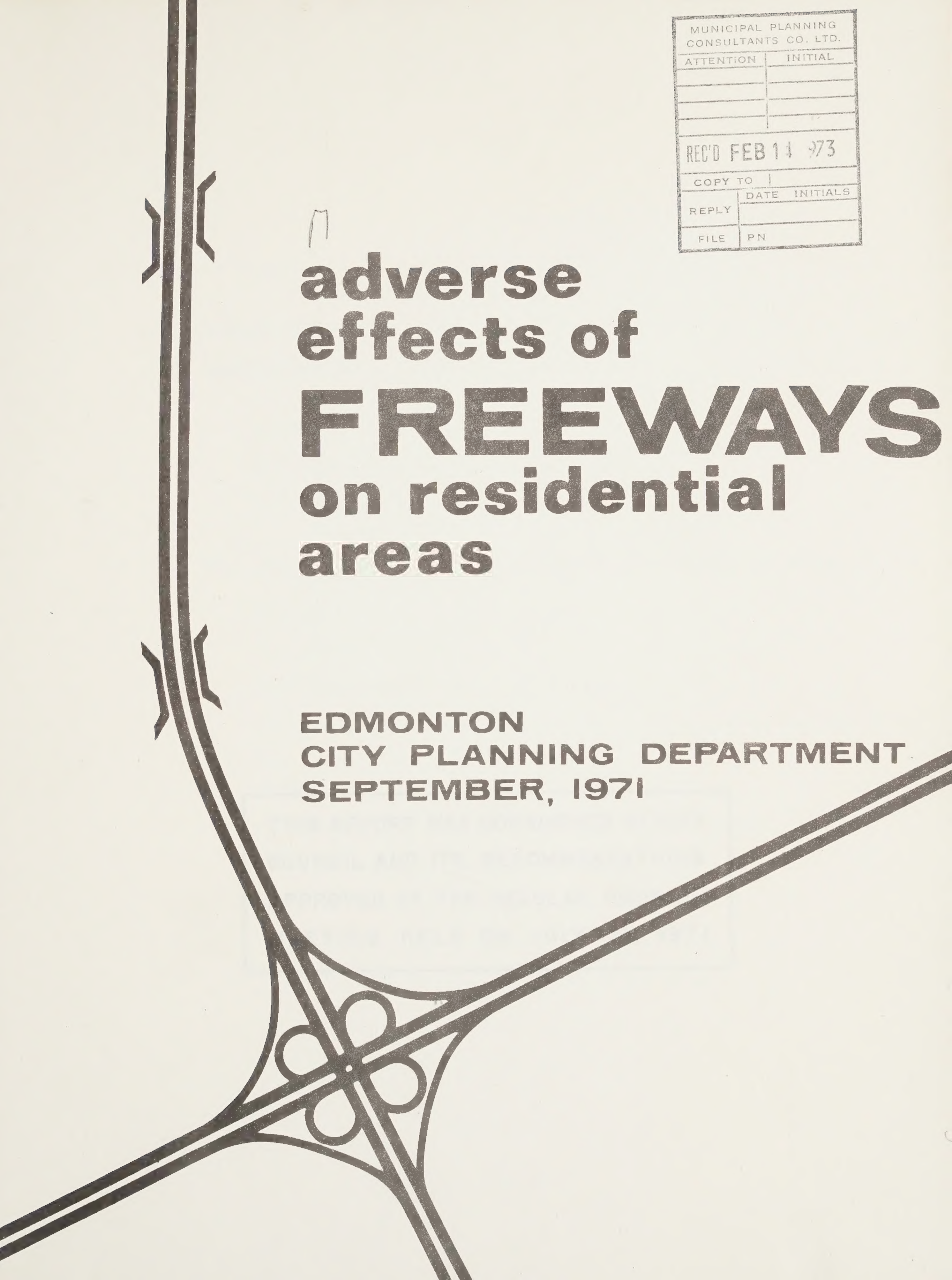


adverse effects of FREEWAYS on residential areas

EDMONTON CITY PLANNING DEPT.



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adverse effects of FREEWAYS on residential areas

EDMONTON
CITY PLANNING DEPARTMENT
SEPTEMBER, 1971

THIS REPORT WAS CONSIDERED BY CITY COUNCIL AND ITS RECOMMENDATIONS APPROVED AT THE REGULAR COUNCIL MEETING HELD ON JULY 19, 1971

THIS REPORT WAS CONSIDERED BY CITY
COUNCIL AND ITS RECOMMENDATIONS
APPROVED AT THE REGULAR COUNCIL
MEETING HELD ON JULY 18, 1974

INTRODUCTION

At the regular meeting of City Council on February 8, 1971, Alderman Mrs. Una M. Evans moved:

> "That the Planning Department be authorized to do a study on the possible deleterious effects of freeways on adjoining residential lands and make recommendations to reduce such effects to a minimum."

The motion was concurred in by City Council.

This report is addressed specifically towards identifying these deleterious effects and presenting general recommendations as to how they might be overcome.

It is recognized however that freeways and high standard roadways are a necessary and integral part of the urban communications system, essential to the covenient movement of goods and people. The problem is primarily one of the degree of provision of these facilities, their standards in relation to adjoining areas and the manner in which they are integrated in the urban environment.

RECOMMENDATIONS

1. Because the freeway is a large scale facility and can bring with it numerous problems, future functional Planning studies should be broadened in scope so that the potential adverse effects can be minimized. Such studies should involve aesthetic, sociological and environmental considerations so that full attention can be given to noise, air pollution, visual disturbance and social disruption.

2. Both the public in general and specifically those residents who are directly affected by freeway plans should be informed about future routes prior to project finalization. Citizens should also be given full opportunity to make their views about specific freeway routes known through formal public hearings.

I. GENERAL

1. Definition and Function of Freeways

A freeway is a high capacity multi-lane divided highway with full control of access by means of interchanges which permit entry onto and exit from the freeway. All intersecting roads, railways and pedestrian crossings are grade separated from the freeway.

The function of the freeway is to permit an uninterrupted flow of traffic to travel at high speeds (from 60 - 80 miles per hour) throughout the freeway system or between interchange points.

2. Types of Freeways

Freeways may be straight forward four lane divided highways with a narrow median and appropriate interchanges and grade separations, having a right-of-way as limited as 120 feet, or they may be complex multiple lane facilities (sometimes having 12 or 16 lanes) with numerous multi-level interchanges and collector-distributor roads paralleling the through traffic lanes. The latter may have an average right-of-way of 500 feet or more, depending on the number of lanes required.

Generally speaking, freeways may be classified into three distinct types:

(1) at grade
(2) depressed
(3) elevated

Each type is illustrated in Figure 2.

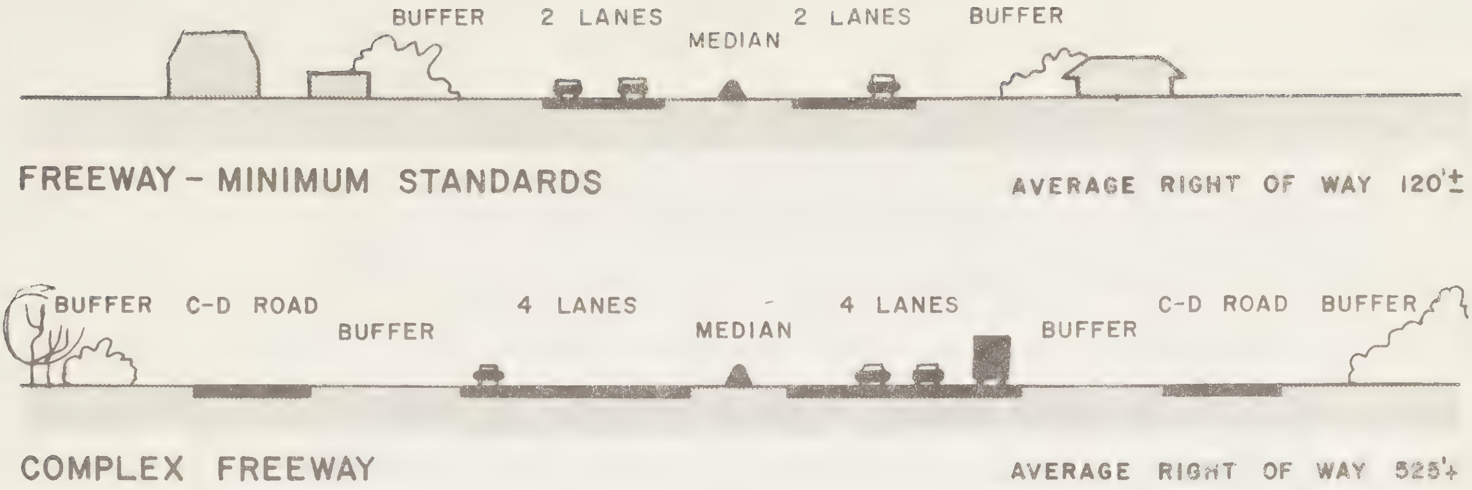

Figure 1. Comparison between a simple four lane freeway and a more complex eight lane facility utilizing collector - distributor roads. The difference in right of way requirements may be quite large - in this case 400 feet; equivalent to the length of an average rectangular city block.

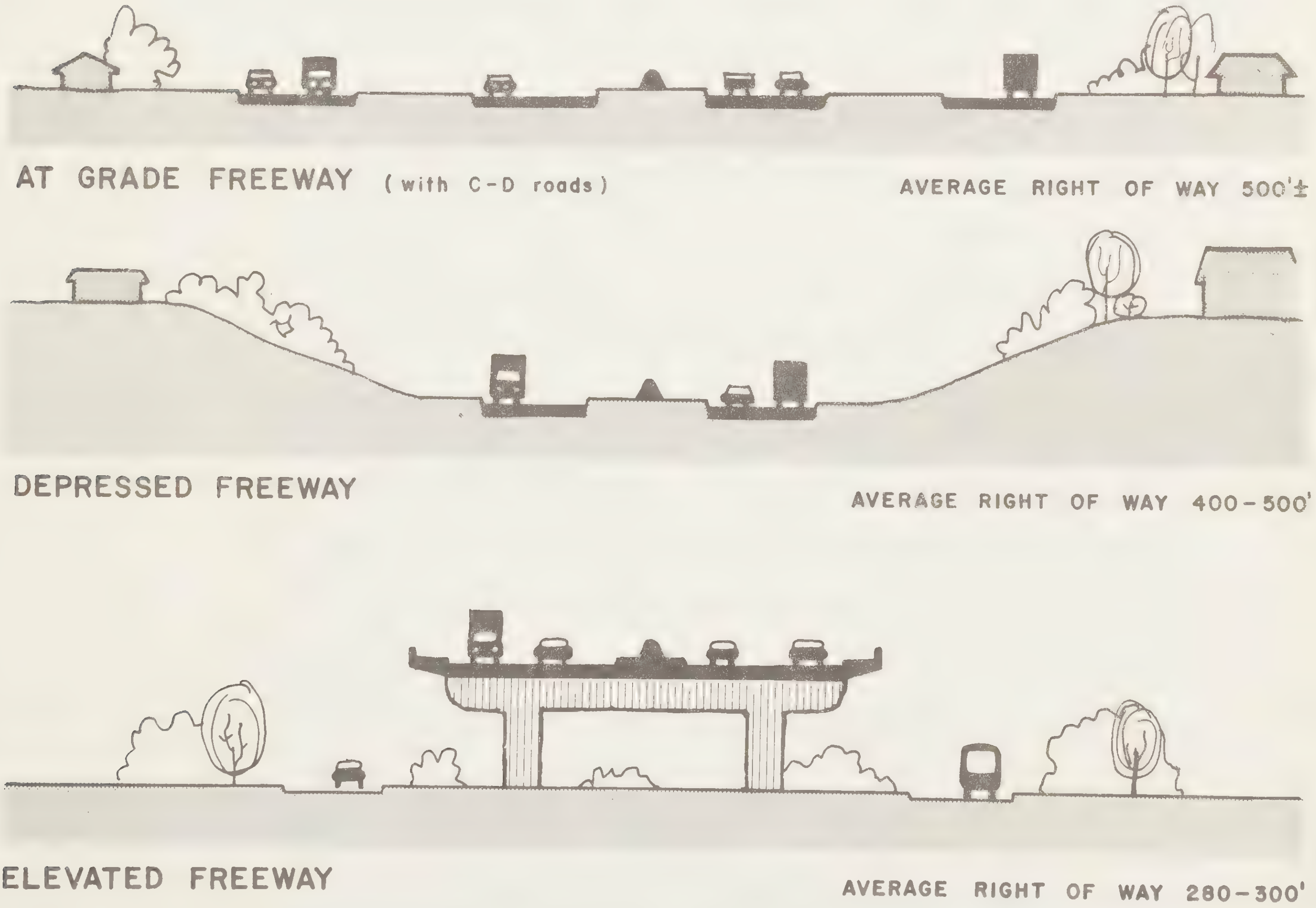

Figure 2. Basic Freeway Types

II ADVERSE EFFECTS

1. Noise

It is generally agreed by experts that traffic noise is one of the most predominant sources of annoyance to urban dwellers.[1] In a city no other single nuisance is of comparable importance. With the advent of freeways and expressways, carrying more traffic at higher speeds, there has been a corresponding increase in the level of traffic noise as each new facility is constructed. Figure 3 illustrates noise levels at various locations in a typical city.

Although many people have been conditioned to tolerate traffic noise, the introduction of freeways through or adjacent to residential areas creates such a dramatic change in noise levels that the residents living in these areas suffer additional "noise pollution" in comparison to those residing in neighbourhoods which are situated away from the freeway. Tests conducted near freeways have shown that the level of traffic noise 50 feet from the pavement edge is about 76 decibels - a level considered moderately loud. (See Table 1).

The high level of traffic noise adjacent to the freeway represents the sum total of all the individual noises produced by vehicles which utilize that freeway. It is made up of the nearly constant roar of freely flowing traffic and the more identifiable noise "peaks" which surface above the steady noise level.

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[1] Great Britain, Committee on the Problems of Noise, Noise (Final Report) Cmnd. 2056, (London HMSO, 1964)

The cause of the first effect is primarily the result of:

(1) the action of the atmosphere on the body of a vehicle as it is travelling at a relatively high speed (air friction); and

(2) the action of rubber tires rotating at fast speeds on the freeway pavement (surface friction).

The combined noise from both is normally characterized as a "swishing" sound to the listener. In technical terms the noise source (travelling vehicle) is distributed along a line (the freeway or expressway), and therefore radiates with cylindrical symmetry to the adjacent areas. This radiation property gives rise to a decrease in sound pressure level of three decibels for each doubling of distance from the line source (neglecting atmospheric attentuation). This result has been observed in mathematical simulations and actual measurements. Under certain weather conditions, such as rainfall, these effects are even more pronounced.

The noise peaks on the other hand, although not as continuous nor as intense as the steady background noise level, are nevertheless the most immediately disturbing effect of the high level of traffic on the freeway. This is largely due to the fact that these peaks, being of a different frequency (much higher), stand out more in contrast to the steady roar.

Their primary sources are vehicle motors, gears, transmission and muffler exhaust. In addition to these noise peaks are caused by brake squealling, tire screeching, horn blowing and the

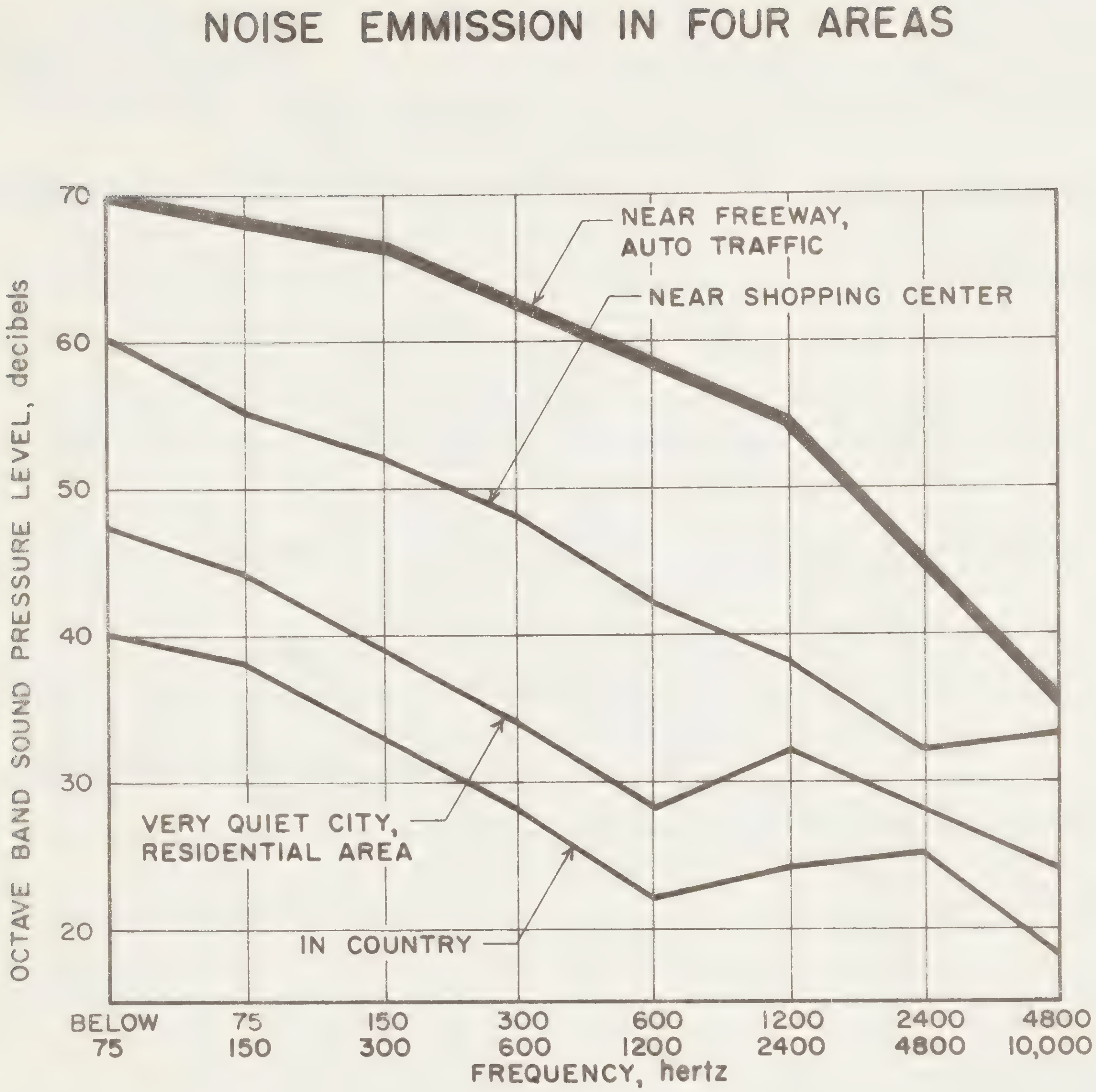

Figure 3. A comparison of noise levels in four different areas of Austin, Texas. The level of noise near the freeway was rated the highest of all four. From Consultative Group on Transportation Research, Organization for Economic Cooperation and Development, Urban Traffic Noise: Strategy for an Improved Environment, August 1970, p. 20, (Mimeographed).

Table 1. SOUND LEVELS AND LOUDNESS OF SELECTED NOISE SOURCES IN OUTDOOR ENVIRONMENTS (70 dB(A) taken as base)

dB(A)	Over-All Level (Sound Pressure Level Approx. 0.0002 Microbar)	Noise Source	Loudness (Human Judgment of Different Sound Levels)
130			
	UNCOMFORTABLY	Military Jet Aircraft Take-Off with after-burner from Aircraft Carrier @ 50 ft. (130)	32 times as loud
120			
	LOUD	Turbo-Fan Aircraft @ Take-Off Power @ 200 ft. (118)	16 times as loud
110			
	VERY	Jet Flyover @ 1000 ft. (103) Boeing 707, DC-8 @ 6080 ft. Before Landing (106) Bell J-2A Helicopter @ 100 ft. (100)	8 times as loud
100			
	LOUD	Power Mower (96) Boeing 737, DC-9 @ 6080 ft. Before Landing (97) → Motorcycle @ 25 ft. (90)	4 times as loud
90			
		Car Wash @ 20 ft. (89) Prop. Plane Flyover @ 1000 ft. (88) → Diesel Truck, 40 mph @ 50 ft. (84) Diesel Train, 45 mph @ 100 ft. (83)	80 dB(A) 2 times as loud
80			
	MODERATELY LOUD	High Urban Ambient Sound (80) → Passenger Car, 65 mph @ 25 ft. (77) → Freeway @ 50 ft. from Pavement Edge, 10 A.M. (76±6)	
70			70 dB(A)
		Air Conditioning Unit @ 100 ft. (60)	½ as loud
60			
	QUIET	Large Transformers @ 100 ft. (50)	¼ as loud
50			
		Bird Calls (44) Lower Limit, Urban Ambient Sound (40)	1/8 as loud
40			
	JUST AUDIBLE	(dB(A) Scale Interrupted)	
10			
0	THRESHOLD OF HEARING		

Adapted from: Cohen, Alexander; Anticaglia Joseph R.; Jones, Herbert H., Noise Induced Hearing Loss-Exposures to Steady State Noise. Paper presented at the A.M.A. Sixth Congress on Environmental Health, Chicago Ill. April, 1969, p. 9 (Mimeographed)

SOURCES OF NOISE GENERATION IN VEHICLES

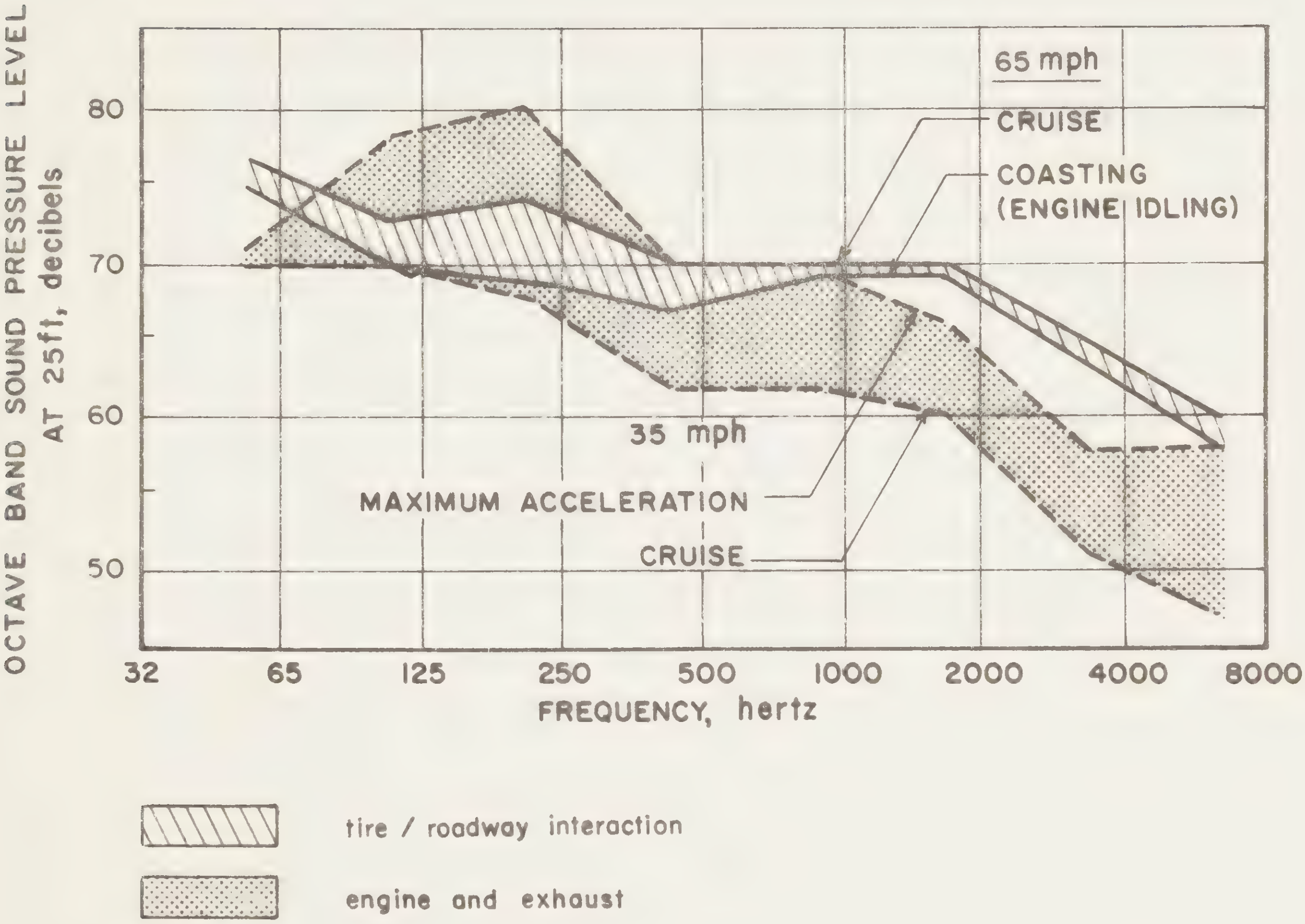

Figure 4. This graph shows the level and frequencies of the two predominant sources of noise generation in motor vehicles, i.e. engine and exhaust and tire and roadway interaction. Noise from tire/roadway interaction predominates for 65 mph cruise conditions, particularly in high frequencies, as evidenced by a small decrease in spectrum from cruise to coasting. Engine and exhaust noise predominates for maximum acceleration at 35 mph, as shown by the large increase in the entire spectrum above cruise.

From Galloway, W. J. Clark, W. E., Kerrick, J. S., Urban Highway Noise - Measurement, Similation and Mixed Reaction. Bolt, Beranek and Newman Inc. Technical Report No. 1505, November, 1968.

rattling of loose vehicle bodies. Noise peaks are associated with separate moving sources (usually trucks). Because of its localized nature, the noise level from peaks radiates with spherical symmetry, giving rise to a fall off of six decibels per doubling of distance from the source. The passage of the vehicle, therefore, produces a peak in sound pressure level which is superimposed upon the "background" noise. Noise peaks can vary considerably according to the type of vehicle and the degree of engine muffling employed.[2]

Both the steady roar effect and individual noise peaks can be altered by any obstructions located between the source and listener. On the freeway for example, concrete overpasses, guard rails, signs and other solid structures tend to momentarily shield or reflect the noise produced by each moving vehicle. When there is a high volume of traffic (e.g. 2 vehicles per second) travelling at an average speed of 60 mph. past these objects, a staccatto-like effect is produced which, though not as loud as the noise peak, does nevertheless stand out and can be considered equally as irritating.

A number of specific vehicles can be identified as the most frequent noise offenders on the freeway. They consist mainly of heavy duty trucks and large commercial carriers, such as long distance tractor trailer units, two or three axle trucks or vans, concrete mixers, waste disposal trucks, tankers, dump trucks and intra-city buses. The noise produced by units powered with diesel engines is particularly offensive. It has been

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[2] U.S. Department of Housing and Urban Development, Noise in Urban and Suburban Areas, January, 1967, p. 9.

demonstrated that the loudest noises are emitted by large trucks whose mufflers are above the level of the cab. Also, the presence or condition of the truck exhaust muffler has a bearing on how much noise is produced. Tests have shown that the difference between no muffler at all and a stock muffler in good condition is typically fifteen decibels. Field observations also indicate that the truck noise sources which are most disturbing in residential areas are those with a muffler in a somewhat deteriorated condition.[3]

In addition to engine and muffler noise some tractor trailer trucks, notably the flat bed variety, pull trailers which rattle and thus produce a good deal of noise on the slightest irregularity in the pavement surface. Loose loads being transported in these trucks also contribute to high noise levels especially when they are travelling at 60 or 70 mph. speeds on the freeway. Since the freeway is usually designated as a truck route or inevitably becomes one, there is a tendency for all heavy commercial traffic to use this facility almost 24 hours a day much to the annoyance of adjacent residents.

A special class of vehicle which can be even more irritating on the freeway than truck traffic are motorcycles, scooters and certain sports cars. If not equipped with mufflers, the noise from motorcycles and scooters can be distinguished well above the general traffic noise level. It has been clearly established that at a constant speed of 65 mph., as well as

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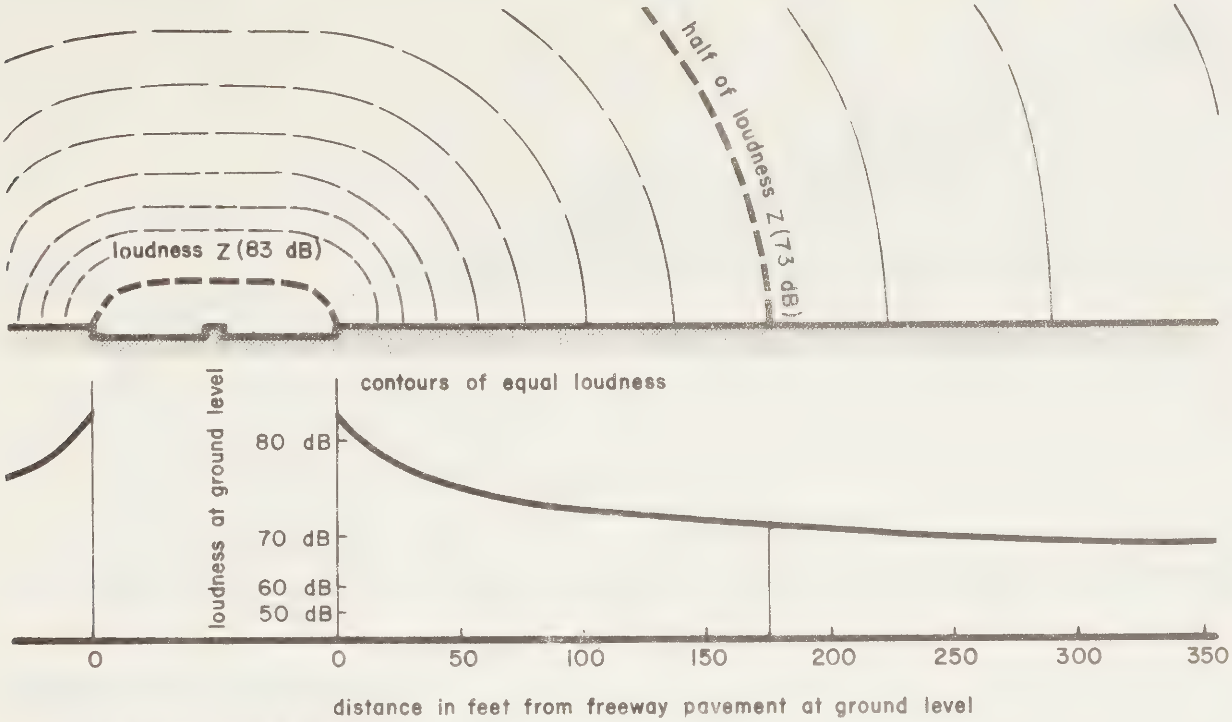
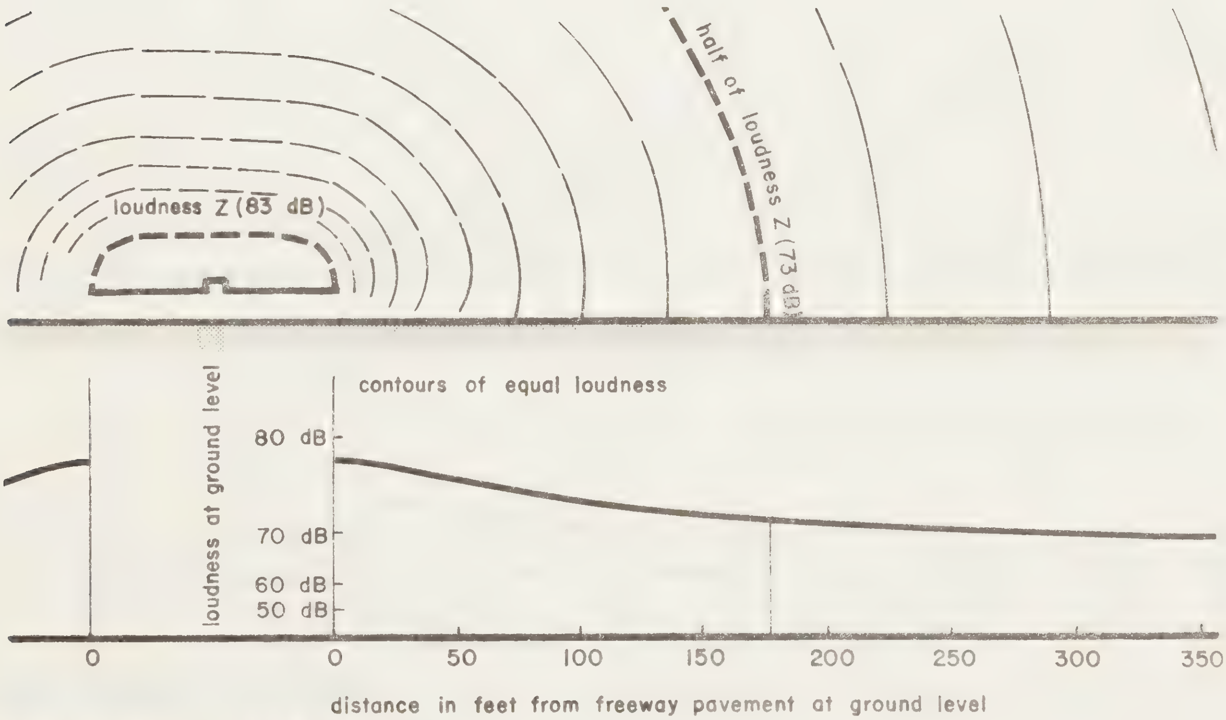
[3] Organization for Economic Cooperation and Development, Consultative Group on Transportation Research, Urban Traffic Noise, August 1970, p. 37.

NOISE EMISSION CHARACTERISTICS BY FREEWAY TYPE

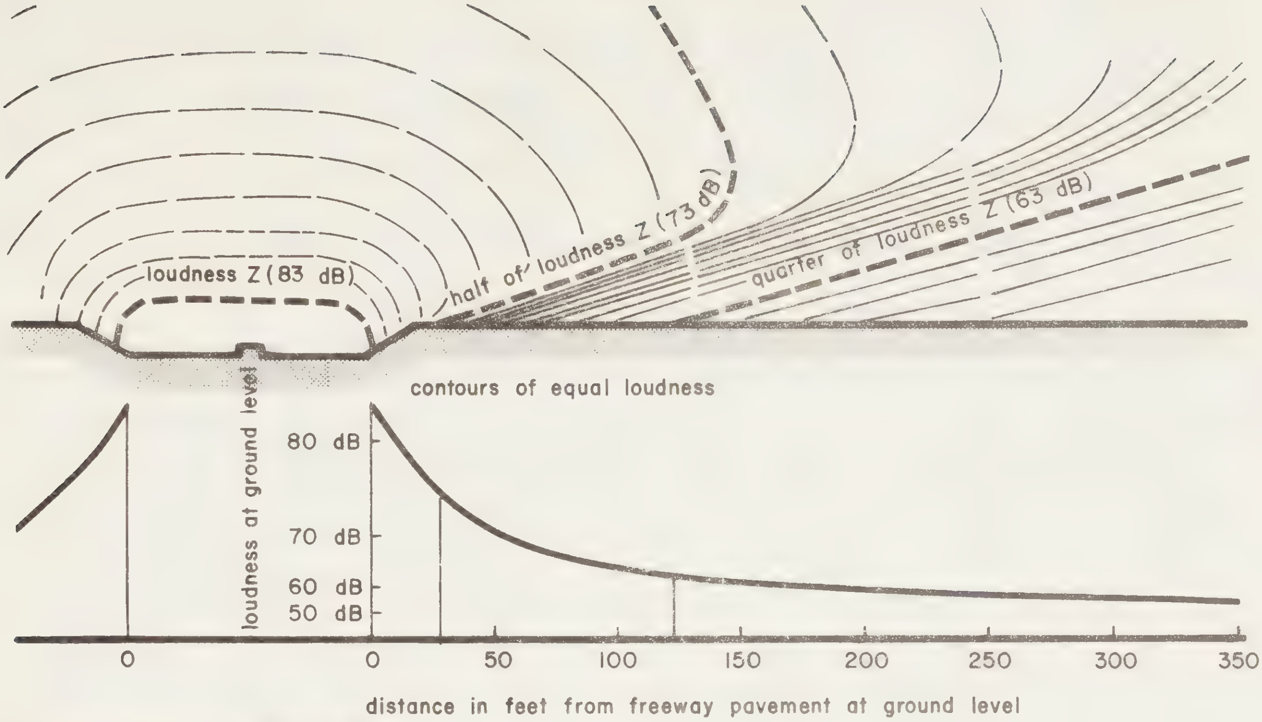


AT GRADE FREEWAY

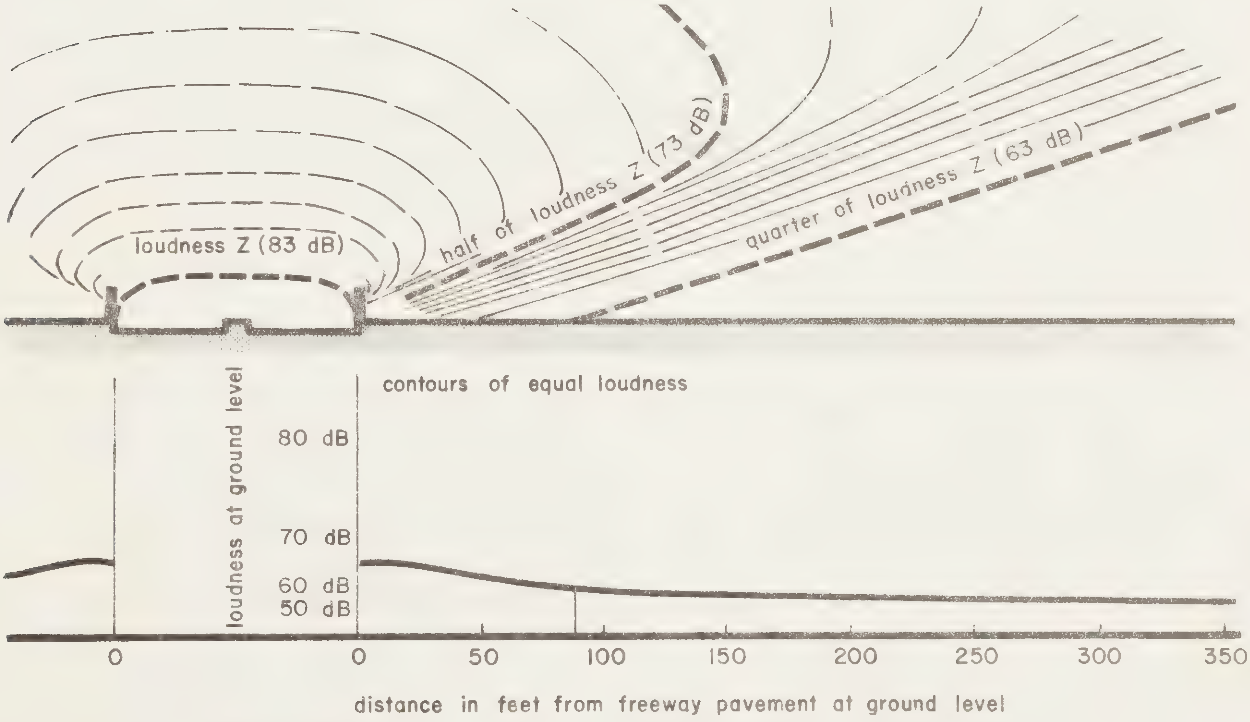


ELEVATED FREEWAY

Figure 5. Noise emitted from an at grade or an elevated freeway with no barrier travels a considerable distance outward (In this case the noise level "Z" (73dB) is shown 175 feet from the source). Adapted from, Traffic Noise, Greater London Council, 1966.



DEPRESSED FREEWAY



AT GRADE FREEWAY

Figure 6 When the freeway is depressed or a barrier is introduced on the at grade freeway the point at which the noise level "Z" (73dB) occurs is reduced considerably. In the case of the depressed freeway it would be approximately 25 feet from the noise source, and for the at grade facility it would be even less. Adapted from: Traffic Noise, Greater London Council, 1966.

during acceleration, motorcycles are much noisier than passenger cars. Sports cars can also contribute to noise pollution at high freeway speeds. The noise usually generated by them is a low frequency "roar", but even this excessive noise would be less annoying were it not for the frequent rapid accelerations with accompanying squealling of tires and grinding of gears which appear to be characteristic of such vehicles.[4]

A distinction should also be made between the differing degrees of noise prevalent at various points along the freeway. For example, those residences located midway between interchanges would be subject to the general noise from passing traffic while houses nearer the interchanges would suffer from additional noise produced by the continuous acceleration and deceleration of vehicles entering and exiting the interchange ramps of the freeway. It is also very likely that the incidence of noise from squealing tires, gear changes and air brakes would be more prevalent at such locations.

There is no question that noise in general and the constant noise generated by a freeway in particular is harmful to those residing near the source. The physiological effects of noise have been investigated by observation and experiment. Prolonged or repetitive exposure to noise of certain intensities will produce different degrees of hearing loss.

In the past few years, scientific study has extended the knowledge of the physical effects of noise to include a variety of chemical and physiological reactions involving blood, heart,

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[4] Ibid., p. 38.

eyes, skin, stomach and esophagus. It is now clearly established that noise above 75 dB (A) creates a number of temporary changes in the physiological state of man.[5]

Psychological effects of noise are less well established. Experiments have been performed which indicate the "complaint" response to various types and intensities of noise by small sample populations and particular circumstances. However, human adaptability is well known; fortunately for his emotional stability and physical survival, man can adjust to a wide range of conditions. Psychology tells us though that this adaptation usually takes its toll in the unconscious part of the human mental nervous system. Precisely in what way and how much noise affects us is not yet clear. Neverthless, most psychologists and psychiatrists seem unanimous in their opinion that noise is registered in and affects the unconscous mind and central nervous system as an irritant or acts disruptively in some manner.

2. Air Pollution

Next in importance to noise generated by freeway traffic is the adverse effect of air pollution produced by that traffic on adjacent residential areas. Although vehicles using the freeway are no different from those travelling on all city streets, the increase in air pollution in the vicinity of the freeway is largely due to the great volume and density of traffic attracted to such a facility. In freeway oriented

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[5] Branch, M. C., Beland, R. D. et al, Outdoor Noise and the Metropolitan Environment, (Los Angeles: 1970) p. 3.

cities it has been demonstrated that motor vehicle exhaust is the major source of air pollution.[6]

Vehicles powered by internal combustion engines are the chief generators of this type of pollution. Because internal combustion engines, particularly those in high powered automobiles, are very inefficient, a significant volume of fumes is released into the air as a result of this imperfect combustion. The principle sources responsible for the emission of these fumes are:

(1) tail pipe exhaust (60%);
(2) crankcase breathers (30%); and
(3) ventilation holes in carburetors and tanks (10%).

The substances released into the air from these sources are organic compounds, made up largely of unburned hydrocarbons, oxides of nitrogen, carbon monoxide, and carbon dust. Carbon monoxide is toxic and could affect individuals in the vicinity where it is released with sickness, dizziness and headaches while it has been found that carbon dust can act as a carrier for cancer producing compounds. Such fumes are especially harmful to elderly people, particularly those who suffer from heart and respiratory ailments.

Although visible smoke from tail pipes is disagreeable and carbon monoxide in heavy concentrations in an enclosed area can be fatal, it is the nitrogen oxides from exhaust fumes which constitute the most dangerous form of air pollution - photochemical smog. In sunny weather these nitrogen oxides

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[6] Air Pollution Foundation, Air Pollution and Smog, (San Marino, Calif., 1960) p. 11.

and olefinic hydrocarbons which are "manufactured" in the automobile engine participate to produce this effect. A freeway, particularly if depressed or if it runs through a ravine or river valley can trap such smog and carbon monoxide in the immediate area for considerable periods of time.

The more prominent manifestations of such atmospheric photochemical oxidants are eye, throat and pulmonary irritations, reduction in visibility and odor and leaf injury to many plants. Eye irritation is the most commonly recognized and troublesome of these. Although the irritation usually disappears rapidly after exposure ends, the experience is probably the most annoying aspect of photochemical air pollution. The pulmonary effects of such smog have also been noted in studies of patients with severe emphysema.[7] When exposed to smoggy air these patients had greater difficulty in breathing. Other tests have revealed that normally healthy people can develop a prevalence of respiratory symptoms when subjected to ambient air for prolonged periods. At best smog conditions may affect a person's performance physiologically or it may decrease motivation due to discomfort.

The effects of automobile air pollution can also be observed on plants growing adjacent to the freeway or in residential areas in close proximity to it. Many shade trees in the city, especially near areas where photochemical air pollution occurs may be damaged. The visible symptoms on leaves include leaf tissue

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[7] Jaffe, L. S., Photochemical Air Pollutants and Their Effects on Menand Animals, Archives of Environmental Health 16:2, Feb., 1968, p. 241-255.

collapse, chlorosis or other color changes and growth alternation or retardation. Ozone in the photochemical smog primarily injures the upper surface of plant leaves, while PAN (peroxyacetyl nitrate) causes a silvering, glazing or bronzing of their lower surface. In one study (Denver) grass collected near the interchange of two freeways contained 3,000 ppm. lead, while grasses growing next to a lesser roadway contained only 700 ppm. Other studies in New York and Maryland demonstrated that vegetables from gardens near sources of automobile pollution had high levels of lead content.[8]

Although the combustion in diesel powered engines is much more efficient in comparison to gasoline motors, a certain amount of pollution is still released into the air by such units. Fumes produced by diesel engines are quite noticeable in large trucks and overhead exhausts and buses. The nuisance combined with the offensive aldehyde odor in diesel exhaust mistakenly leads people to believe that diesels contribute significantly to photochemical smog. It has been proven however that diesel engines contain virtually no hydrocarbons and produce only a minute amount of carbon monoxide. Even so diesel engines do emit black smoke which is visually offensive and contains heavy droplets that often spot windshields and fall on the finish of automobiles following diesel trucks and buses.[9]

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[8] Middleton, J. T.; Kendrick, J. B.; and Schwalm, H. W.: Injury to Herbaceous Plants by Smog or Air Pollution, U.S. Dept. of Agriculture, Plant Disease Reporter Vol. 34:245, 1950. Haagen-Smit, A. J. et al: Investigations on Injury to Plants From Air Pollution in the Los Angeles Area, Plant Physiology, 27:18, 1952.

[9] Air Pollution Foundation, op. cit. p. 14.

There are also some additional miscellaneous pollutants which are released in the vicinity of a freeway. Usually a concentration of rubber particles due to the friction of the many tires on the pavement surface is present in the area. Asbestos particles emitted from the brake linings of open disc brakes, especially, are also in evidence. Then there is the nuisance arising from occasional automobile or truck engines which burn oil. All these contribute to the pungent odor which is usually present along such a facility. A freeway would also tend to generate much more dust and air transportable debris into adjacent residential areas along its path.

3. Visual Distrubance

The environmental quality of a residential area can be affected by an adjoining freeway in yet another way. Because of the demand for freeways to carry great volumes of traffic at high speeds, the basic scale of the freeway is large. Since it is designed to be very wide, it is an extremely formidable structure to incorporate into a city. The freeway consumes a large amount of space for the roadway system itself, the facilities required to support the system (interchanges and arterial feeders) and can disrupt the existing street layout and traditional traffic movements of an area. In comparison to other roadways, freeways are separated visually by changes in level and limitation of access. If they are routed through residential areas they bear little relationship to the remainder of the street pattern and stand out visually and functionally from the surrounding residential area.

The scale of the freeway in relation to the area it passes is the most troublesome problem facing the designer of urban highways. Usually those residences located alongside the freeway are considered undesirable for habitation, change ownership frequently and may become dilapidated as a result of neglect. Quite often their position has been ruined by the construction of the freeway and they are separated from the road by an ugly chain link fence. If houses are situated on local streets which have been "dead ended" because a freeway has been constructed in the area, the surroundings will have altered drastically, especially if such streets become dumping grounds for refuse. (See Figure 10). Strips of land between the freeway right-of-way and private property may also become eyesores if these are left untended. If a freeway is constructed with a service road alongside it, and at the same grade, the apparent width will be increased further with the result a visually depressing no man's land.

Certainly, the type of facility which is built greatly determines the extent to which a freeway creates a visual disturbance to and in an adjacent community. An elevated freeway would be most dominant in this respect. Especially objectionable would be the huge pillars required to support the facility and the complex interchange ramps necessary to permit access to or exit from the freeway. Somewhat less obnoxious but still disturbing, in terms of visual scale, would be the freeway which is constructed at grade. The wide expanse of asphalt and concrete would be physically and psychologically apparent to nearby residents. Perhaps the least objectionable type of

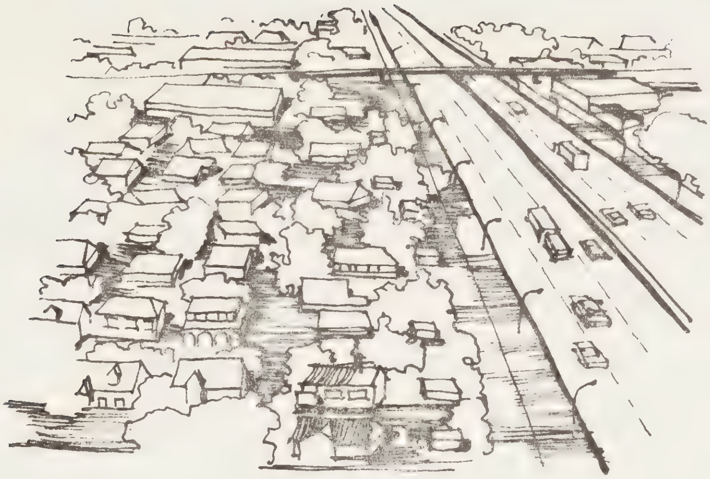


Figure 9 As well as creating a physical barrier to an adjoining community the scale of the freeway can be visually overwhelming to the residents living near it.

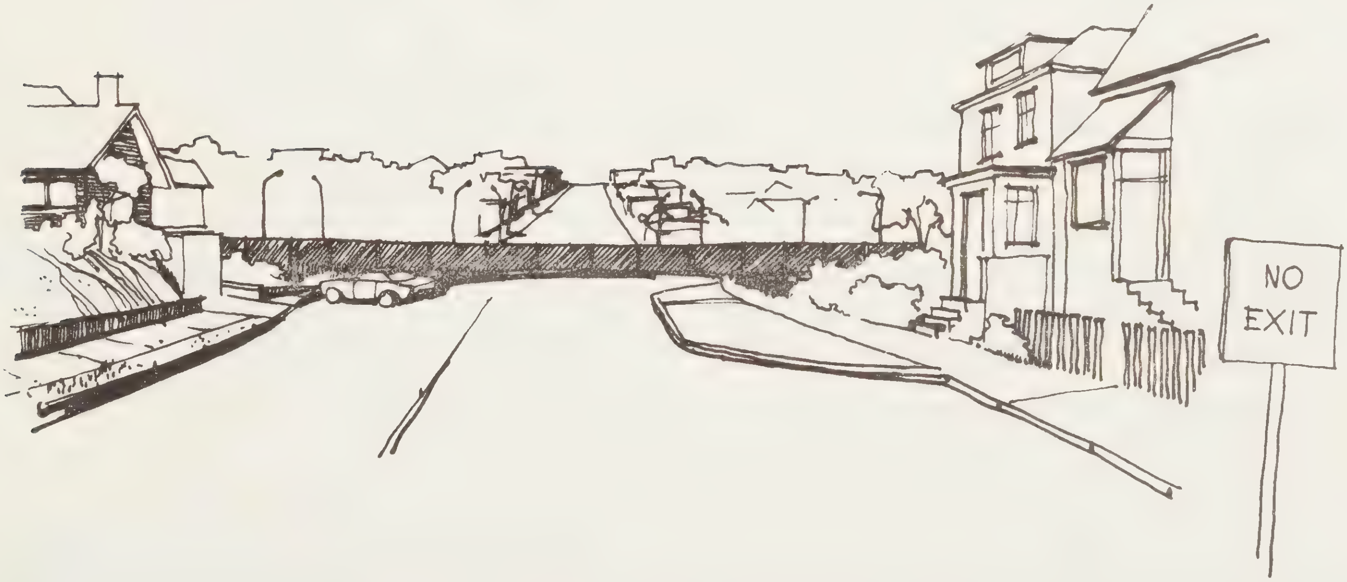
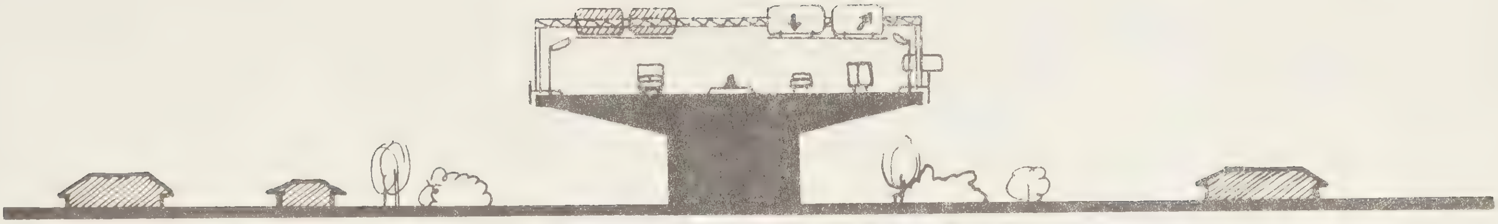


Figure 10 The intrusion of a freeway into a residential area can alter the physical structure of that community. One result may be the "dead ending" of a number of local through streets, thus restricting the accessibility between parts of the residential area.

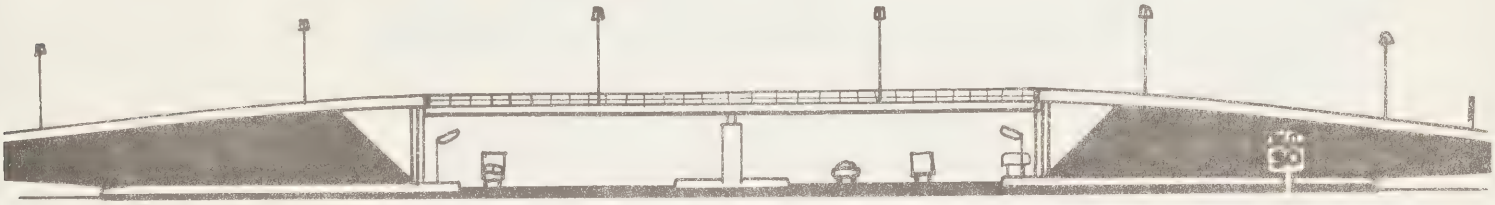
freeway is the one which is depressed below grade. Unless houses are located immediately alongside the right-of-way, the depressed freeway is not as obvious visually, nor does it create as many problems for adjacent residents as the at grade or elevated freeway does.

Not only would the physical structure of the freeway be visually objectionable to adjoining residents but all the "hardware" associated with the freeway may be out of scale in the residential area, which is much more pedestrian oriented. Overpasses, interchange ramps, guardrails and retaining walls would appear harsh and brutal when contrasted to the softer lines of the residential environment. Similarly, large and bright information and directional signs and the tall structures by which they are supported, although designed to be visible for those utilizing the freeway, may have a visually disturbing impact for nearby residents. Other objectionable freeway accessories nearer to the dwellings are the chain link fences, which not only appear to "cage" the adjoining residential area, but in themselves appear disturbing to the eye, especially when windblown refuse is deposited along the fenceline.

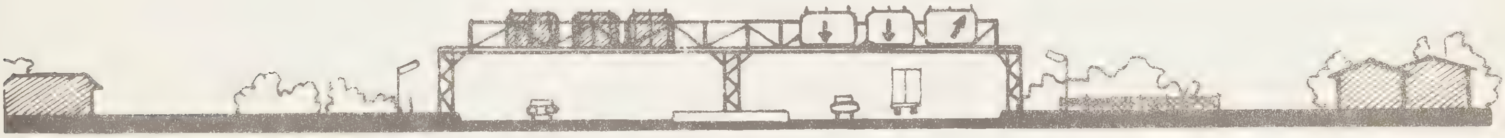
The freeway may have an even greater visual impact on an adjacent residential area in the evening or at night when the stream of traffic using it gives the facility the appearance of a continually moving mass of lights. Those residents located near the right-of-way could also find that their homes and yards are flooded with light from the high intensity lamp standards which illuminate the freeway traffic lanes. Others



ELEVATED FREEWAY

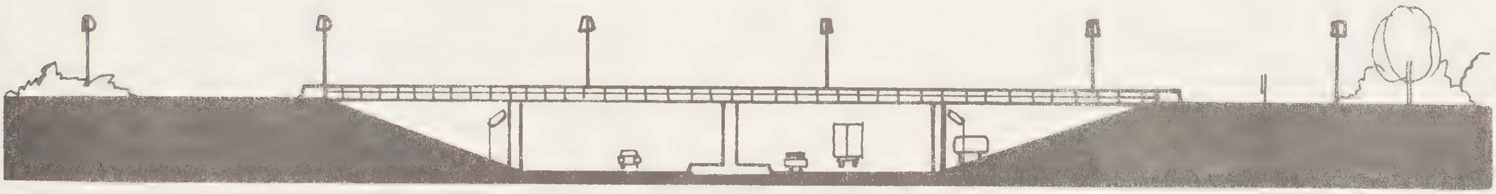


AT GRADE FREEWAY SHOWING OVERPASS AND INTERCHANGE RAMPS

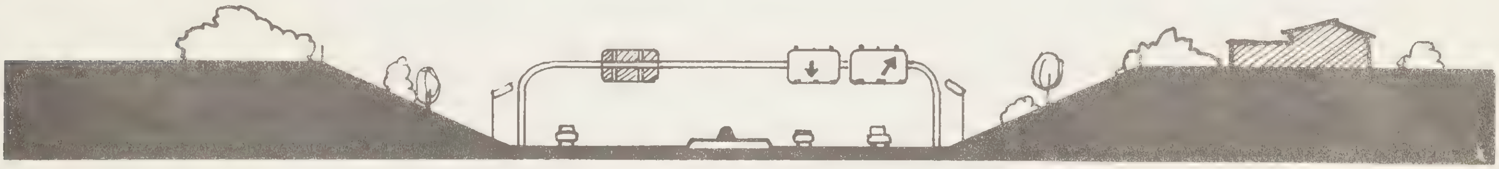


AT GRADE FREEWAY SHOWING SIGN STRUCTURES

Figure 7. The scale of the elevated or at grade freeway and its associated structures as shown above is generally incompatible with a pedestrian oriented residential environment.



DEPRESSED FREEWAY WITH OVERPASS



DEPRESSED FREEWAY SHOWING SIGN STRUCTURES

Figure 8. This scale can be minimized by depressing the facility.

situated near interchange ramps could find headlights continuously flashing into their homes at hight.

A freeway may be visually irritating in still another way. If land originally acquired for a freeway right-of-way is determined to be too narrow for a new facility at a later date or the cost of acquiring additional land for a wider right-of-way is prohibitive, certain design and aesthetic standards may have to be sacrificed in order to construct the freeway. Applying minimum standards in such a case would result in very narrow or a total lack of buffer strips, the necesity for ugly retaining walls, inadequate landscaping or planting and perhaps an at grade rather than a depressed freeway with a very narrow median. Under such circumstances residences would be located closer to the freeway than normally desirable, therefore being much more exposed to the facility.

4. Social Disintegration

Perhaps the most significant adverse effect a freeway has on residents of an adjoining area is the destruction, disturbance or alteration to the pattern of daily life it brings for many residents who are located near such a facility. This effect is least appreciated when route alignments are planned and selected.

Though not as physically discernible as the other adverse effects, the construction of a freeway nevertheless has a great bearing on the viability and social cohesion of the neighborhood through which it passes.

Although social changes are continuously occurring throughout the city at large and within its individual residential areas, these changes are usually slow. Over a period of time populations move from one area to another; neighborhoods deteriorate and dwellings may be torn down piece by piece to accommodate redevelopment. The construction of a large scale traffic artery such as a freeway, which attracts thousands of automobiles, can produce very drastic changes in an adjoining community. The freeway acts as the catalyst or accelerator for changes which can produce major alterations in a great number of interrelated social characteristics in a residential area.

The most direct impact of the freeway is the destruction of individual homes or groups of houses lying in its path. Usually the freeway is routed through older areas where community social links and ties between neighbors are well established. Any disturbance affects such districts more drastically than it would the newer suburban areas since there is generally a greater availability of newer housing throughout the city and residential relocation to newer acreas is much easier in comparison to finding accommodation within the limited stock of housing in older neighborhoods. Often those persons who are displaced by the freeway are long term residents of the area who are very happy in their surroundings and have no desire to move. Their forced relocation can result in many ensuing hardships. Social costs of such relocation and disruption of the community's social fabric often cannot be assigned a price tag.

In these older residential areas of the city where freeways are most likely to be constructed, housing is relatively inexpensive and serves as suitable accommodation for low income groups and those on modest incomes or pensions. Because of the proximity of such districts to the downtown and the residents' familiarity and association with the older part of the city, elderly citizens tend to congregate here. The total destruction or severance of such districts not only affects them personally but also has implications for the city at large if housing in these areas is depleted as a result of a freeway project.

The freeway could also produce some adverse effects for those residents of the area who may be physically untouched by the facility but must live in close proximity to it. At best residential districts which have been severed by a freeway are considered less desirable communities in which to live than they were prior to the construction of a freeway. The whole pattern of social interaction within a formerly cohesive area can thus be broken in one fell swoop. For example, the freeway may become a barrier for children who find that their schools, playgrounds and recreational facilities are accessible only by a lengthy or circuitous route. Friends or neighbors might be cut off from one another. Elderly residents could find that a park, church or local community hall is difficult to reach. Access to local shopping facilities could be impeded by the freeway itself or by the enormous volumes of traffic it generates. A convenient bus line may have been relocated or routes altered, increasing the walking distance to stops thus causing

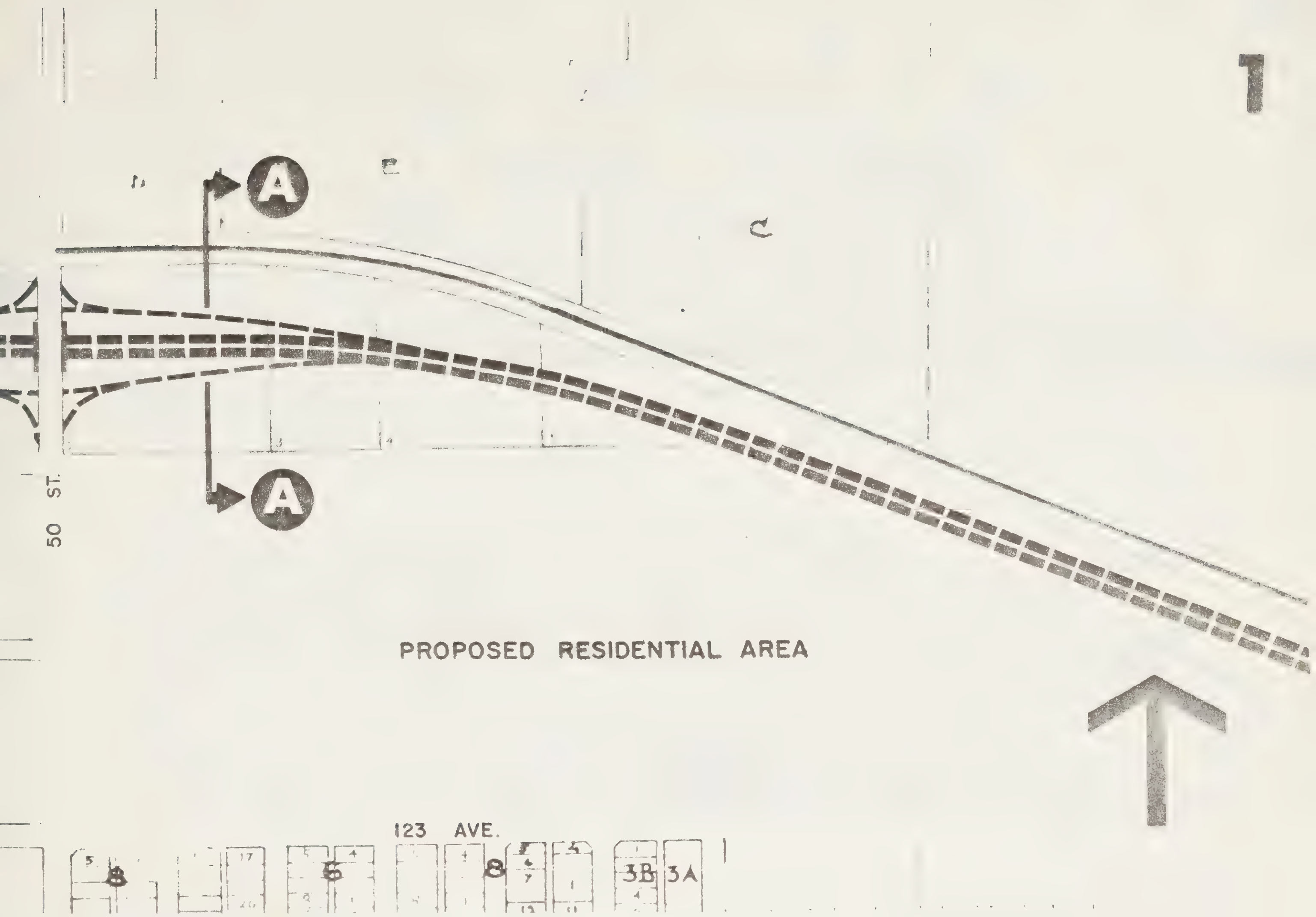
some hardship for elderly persons or low income families. Streets that once had moderate traffic volumes may have developed into major traffic arteries leading to the freeway and thus may have become hazardous to cross.

The social structure of a relatively new residential area can also be undermined by the adverse effects brought on by the construction of a freeway. When a freeway is proposed in a newer area it is planned in conjunction with the adjoining subdivision. However no construction may occur on the right-of-way for several years until such time as there is sufficient demand for such a facility. Then, when the facility is finally constructed, many years after the residents of the area have established their habits and social patterns, the change may be too great for some, particularly those who are situated along the right-of-way. Worse still, plans for the freeway may also have changed in the meantime so that a much larger facility is finally constructed within the confines of the original right-of-way.

APPENDIX

KEY PLAN - FREEWAY SYSTEM

1

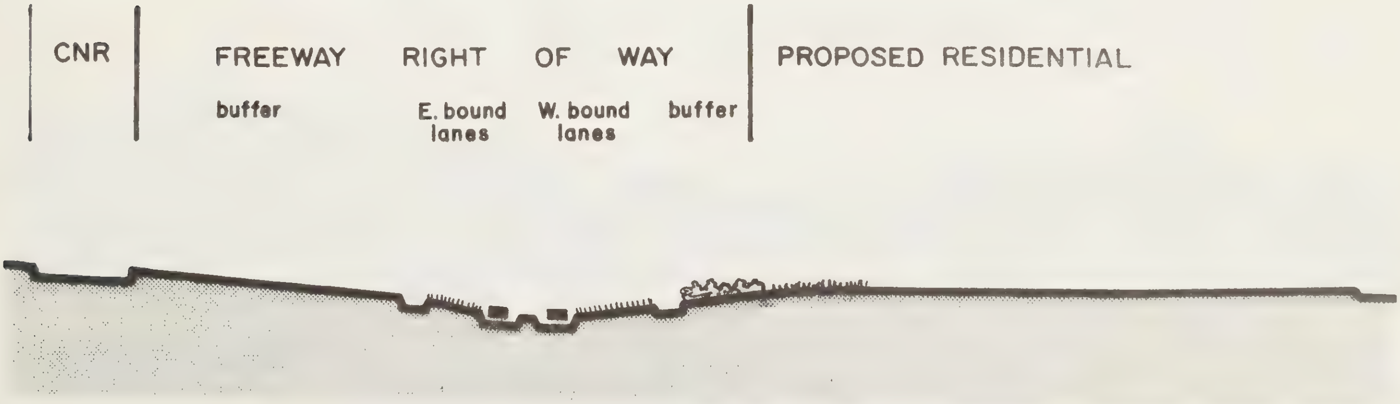


HWY. 16-SANTA ROSA ROAD (freeway standard)

Between 51St. and 38St.

Average Right of Way 300 feet
Average Buffer Width 50 feet

Freeway Proposed ▬▬▬



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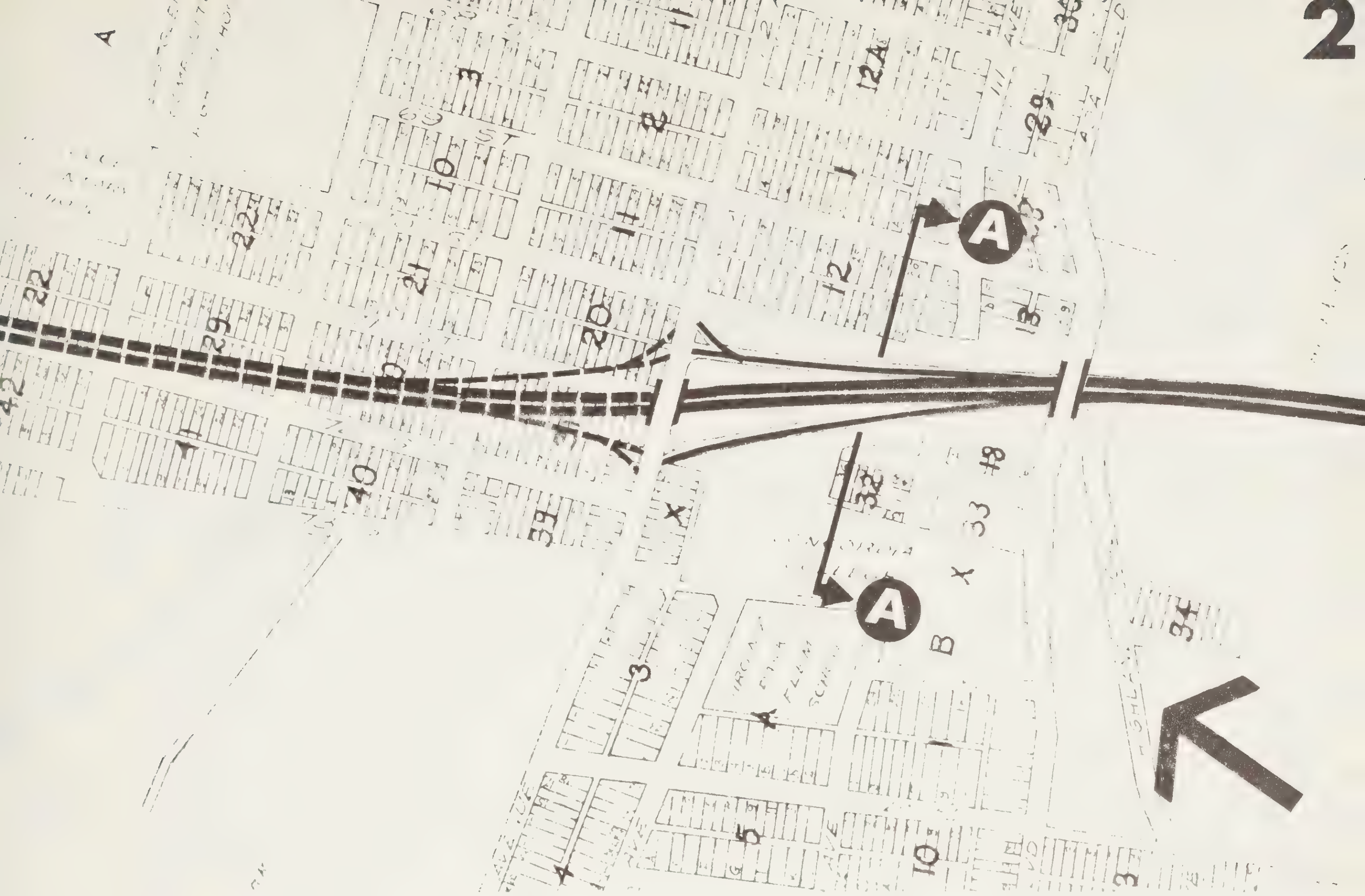
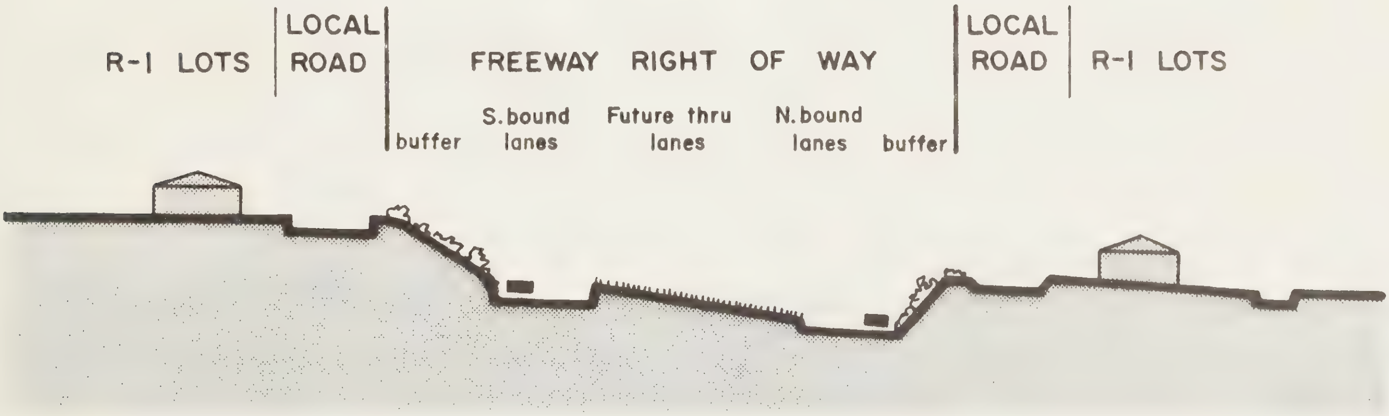


CAPILANO FREEWAY

Between Highlands Golf Course and 116 St.

Freeway Existing ▬▬
Freeway Proposed ▬ ▬ ▬

Average Right of Way 450 feet
Average Buffer Width 150 feet



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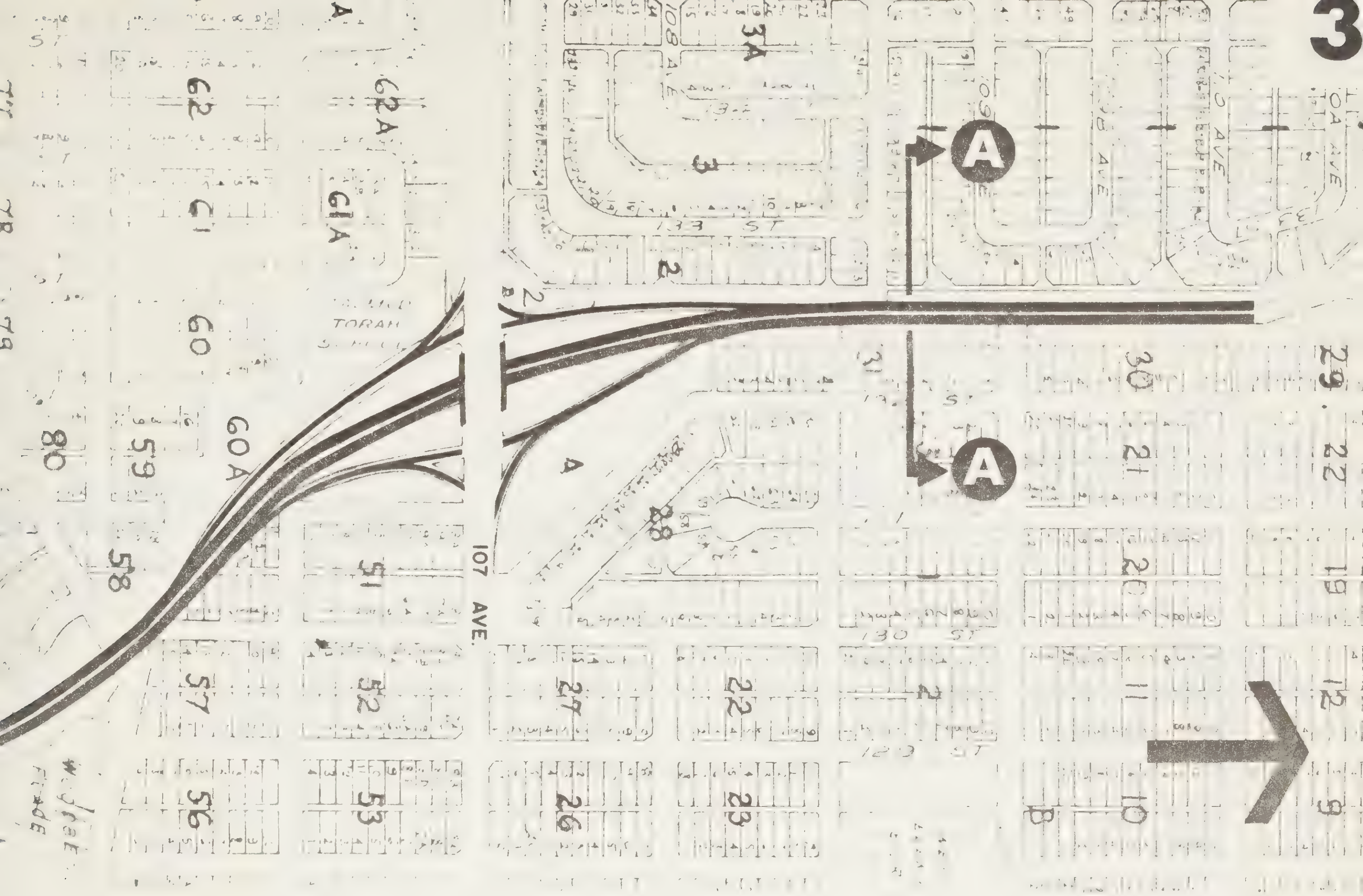
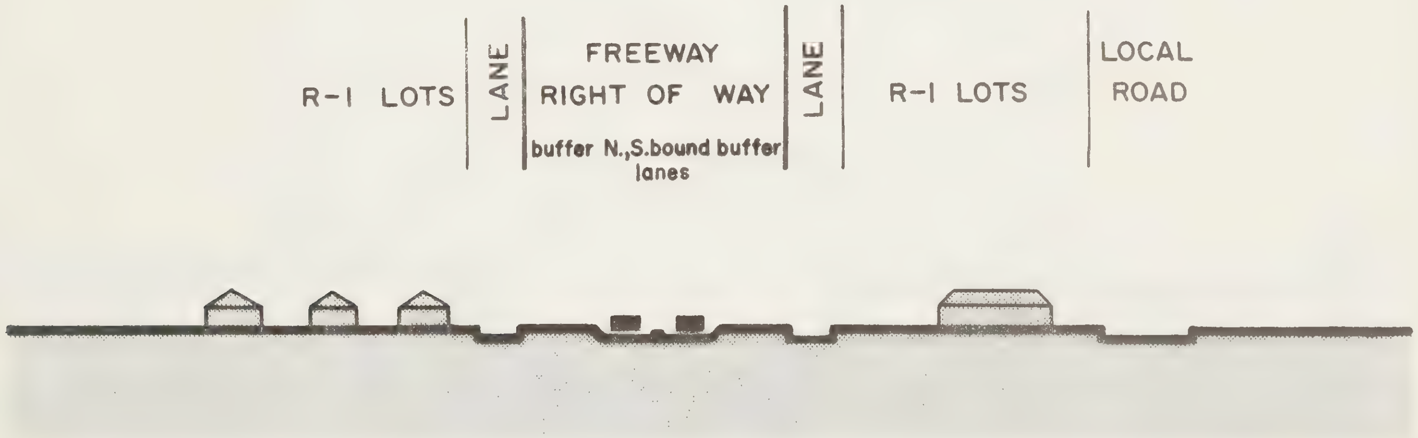


GROAT ROAD (freeway standard)

Between 104 Ave. and 111 Ave.

Freeway Existing ▬

Average Right of Way 150 feet
Average Buffer Width 40 feet



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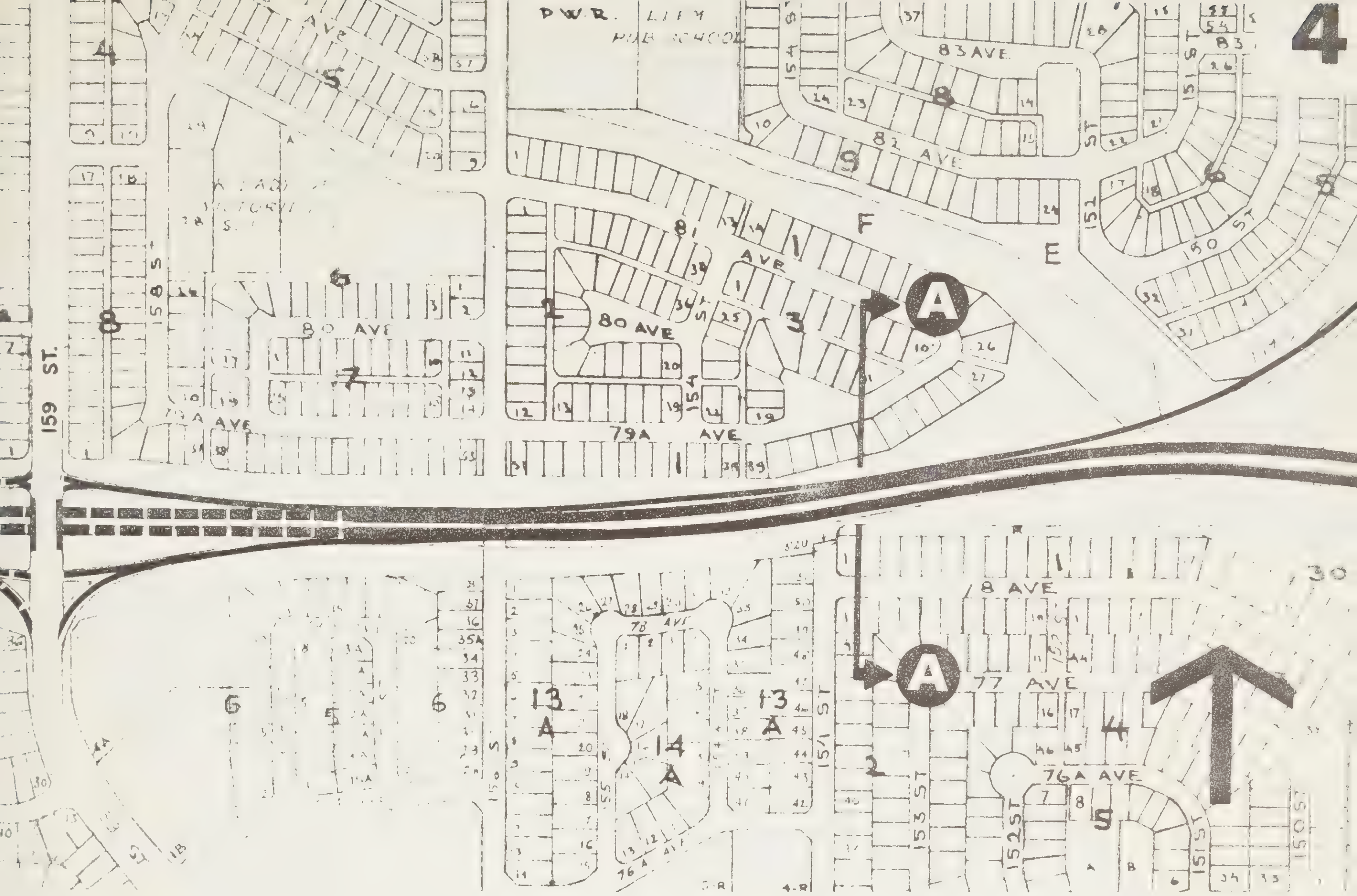
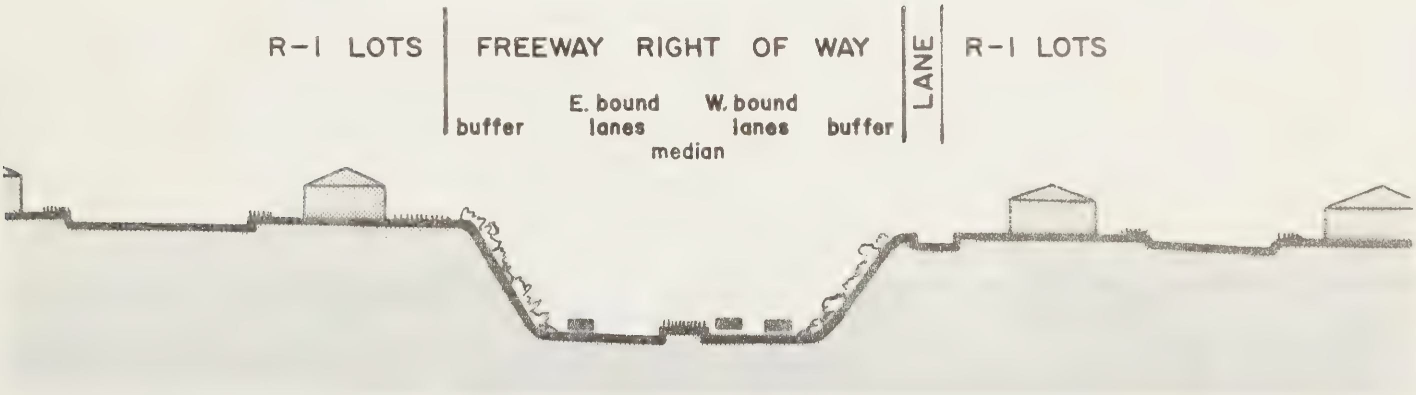


WHITEMUD FREEWAY

Between 149 St. and 159 St.

Average Right of Way 230 feet
Average Buffer Width 75 feet

Freeway Existing ▬▬▬
Freeway Proposed ▬ ▬ ▬ ▬



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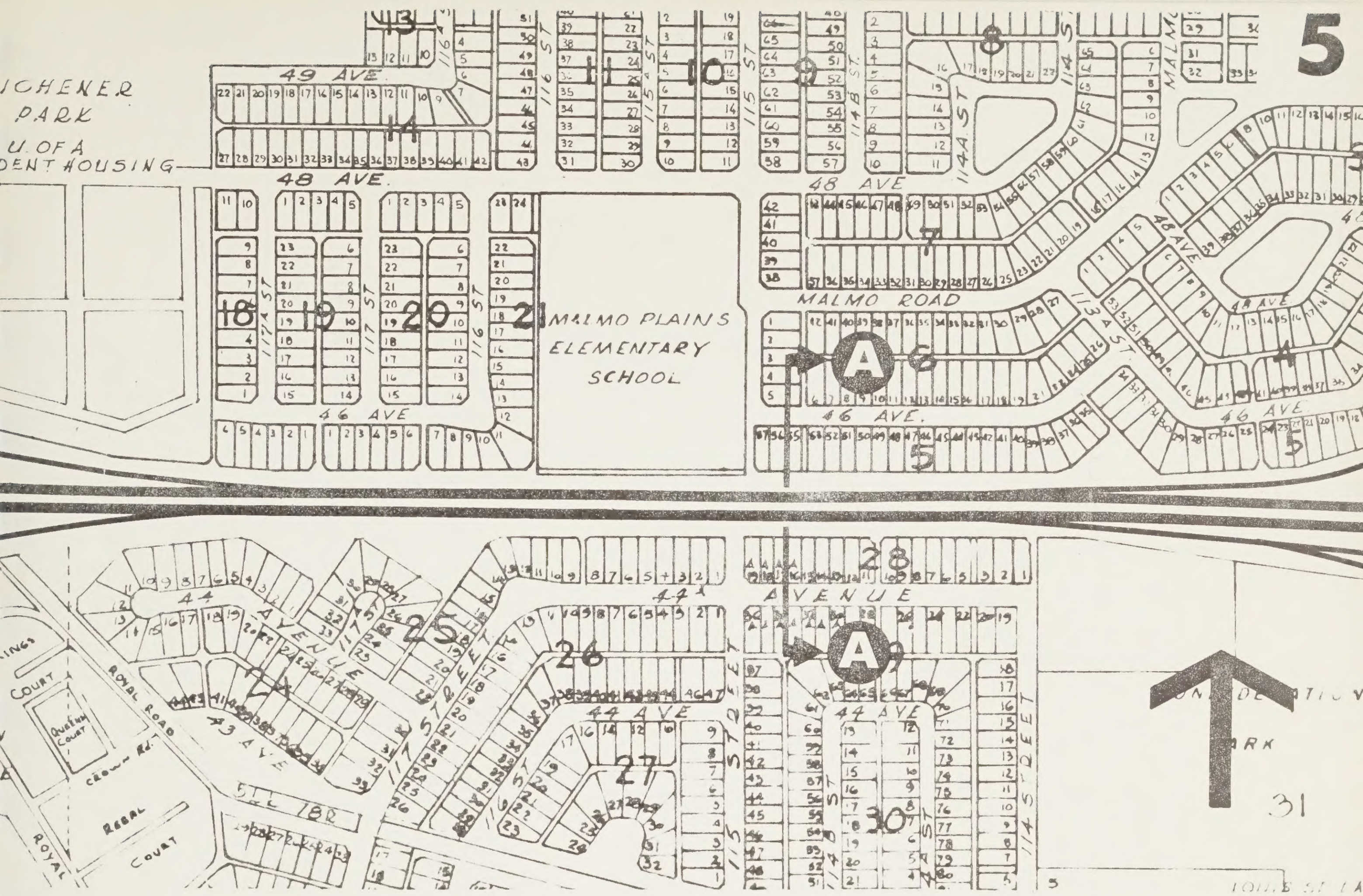
5

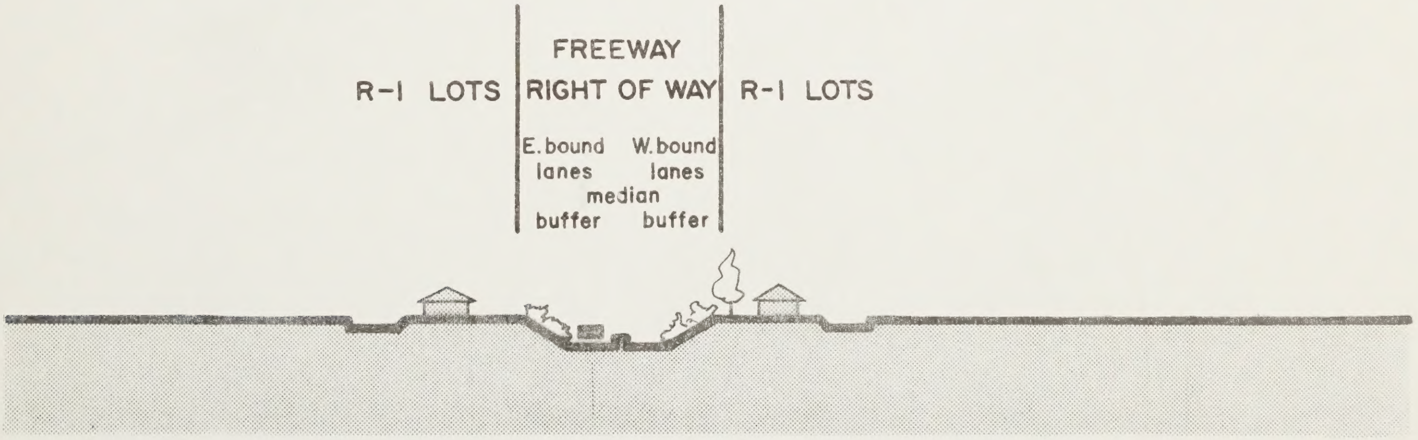


WHITEMUD FREEWAY

Between 122St. & 111A St.

Average Right of Way 220 feet
Average Buffer width 40 feet

Freeway Existing ▬



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